

# Notice of Allowability

Application No.

10/734,218

Examiner

Ling-Siu Choi

Applicant(s)

FUJITA ET AL.

Art Unit

1713

## -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 01/12/2005.
2. ☒ The allowed claim(s) is/are 26-60 and 62-81.
3. ☒ The drawings filed on 15 December 2003 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☒ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☒ Certified copies of the priority documents have been received in Application No. 09/661,626.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  6. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

### Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
Paper No./Mail Date 12/15/2003
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413),  
Paper No./Mail Date 02/07/2005.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_.

**DETAILED ACTION**

1. This Office Action is in response to the Amendment and Response to Restriction Requirement filed January 12, 2005. Claims 1-25 have been canceled and claims 26-81 are now pending.

2. This Application is a divisional application of U.S. Application Serial No. 09/661,626, filed September 13, 2000, now US Patent No. 664,208 B1, which, in turn, is a continuation-in-part of U.S. Application Serial No. 09/391,005, filed September 7, 1999, now abandoned and this application is also a continuation-in-part of U.S. Application Serial No. 09/391,662, filed September 7, 1999, now abandoned.

***Examiner's Amendment***

3. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CAR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Thomas P. Pavelko on February 7 and 17, 2005.

4. The application has been amended as follows:

**Cancel claim 61** without prejudice;

In the Specification, Cross-Reference to Related Applications,

Line 2, change "2000," to --2000, now U.S. Patent No. 6,664,208 B1,--;

Line 3, change "1999, " to --1999, now abandoned; this application is also a continuation-in-part of U.S. Application Serial No. 09/391,662, filed September 7, 1999, now abandoned;--;

Claim 26, line 2, change "reacting:" to --contacting (A) a modified aluminum oxy compound obtained by a process that comprises reacting:--;

Claim 26, line 7, change "substitute" to --substituted--;

Claim 26, line 11, change "compounds;" to --compounds,--;

Claim 26, lines 19-20, change "and contacting said modified aluminum oxy compound (A)" to -- ; --;

Claim 27, line 2, change "compound, obtained" to --compound obtained--;

Claim 27, line 9, change "more," to --more, the molar ratio [(a)/(b)] of the aluminum oxy compound (a) to water (b) is 1/3 to 1/0.01, and the molar ratio [(a)/(c)] of the aluminum oxy compound (a) to the compound (c) is 1/3 to 1/0.01;--

Claim 28, line 2, change "reacting:" to --contacting (A) a modified aluminum oxy compound obtained by a process that comprises reacting:--;

Claim 28, line 13, change "(m1)" to --(M1)--;

Claim 28, line 16, change "compound (A)" to --compound (A);--;

Claim 29, line 2, change "compound, obtained" to --compound obtained--;

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Claim 29, line 8, change “group” to --wherein the modified oxy compound (A) has a ratio of an intensity at 30 ppm (M2) to an intensity at 10 ppm (M1) [M2/M1] in an  $^{27}\text{Al}$ -solid NMR spectrum of 0.60 or more, the molar ratio [(a)/(b)] of the aluminum oxy compound (a) to water (b) is 1/3 to 1/0.01, and the molar ratio [(a)/(c)] of the aluminum oxy compound (a) to the compound (c) is 1/3 to 1/0.01;--;

Claim 29, line 9, change “and” to --with--;

Claim 30, line 2, change “reacting:” to --contacting (A) a modified aluminum oxy compound obtained by a process that comprises reacting:--;

Claim 30, line 8, change “the alcohol” to --the alcohols substituted with a halogen--;

Claim 30, line 23, change “and” to --with--.

*Allowable Subject Matter*

5. Claims 26-60 and 62-81 are allowed.

6. The following is an examiner's statement of reasons for allowance:

The present claims are allowable over the closest references: Geerts et al. (US 5,670,589), Kumamoto et al. (US 6,100,213), Marks et al. (US 5,391,793), and Tsutsui et al. (US 4,990,640).

The present invention relates to a polymerization catalyst obtained by a process comprising the contact of

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(A) modified aluminum oxy compound	
	aluminum oxy compound (a) [ $H_2 / H_1 < 0.35$ ]
	H <sub>2</sub> O (b)
	compound having hydroxy group (c) [tertiary alcohol, halogen-substituted alcohols, halogenated phenol compounds, and silanol compounds]
(B) a transition metal compound	
<p>wherein</p> <p>(1) the modified aluminum oxy compound has a ratio of an intensity at 30 ppm (M2) to an intensity at 10 ppm (M1) of 0.60 or more;</p> <p>(2) the mole ratio[(a)/(b)] of the aluminum oxy compound (a) to water (b) is 1/3 to 1/0.01;</p> <p>(3) the molar ratio [(a)/(c)] of the aluminum oxy compound (a) to the compound (c) is 1/3 to 1/0-0.01.</p>	

(summary of claim 26)

(A) modified aluminum oxy compound	aluminum oxy compound (a') [L2 / L1 ≠ 0.35]	aluminum oxy compound (a) [H2 / H1 < 0.35]
		H <sub>2</sub> O (b)
	compound having hydroxy group (c) [tertiary alcohol, halogen-substituted alcohols, halogenated phenol compounds, and silanol compounds]	
(B) a transition metal compound		
wherein		
(1) the modified aluminum oxy compound has a ratio of an intensity at 30 ppm (M2) to an intensity at 10 ppm (M1) of 0.60 or more;		
(2) the mole ratio[(a)/(b)] of the aluminum oxy compound (a) to water (b) is 1/3 to 1/0.01;		
(3) the molar ratio [(a)/(c)] of the aluminum oxy compound (a) to the compound (c) is 1/3 to 1/0-0.01.		

(summary of claim 28)

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(A) modified aluminum oxy compound	aluminum oxy compound (a") [N2 / N1] $\leq$ 0.35	aluminum oxy compound (a) [H2/H1 $<$ 0.35]  compound having hydroxy group (c) [tertiary alcohol, halogen-substituted alcohols, halogenated phenol compounds, and silanol compounds]
	H <sub>2</sub> O (b)	
(B) a transition metal compound		
wherein  (1) the modified aluminum oxy compound has a ratio of an intensity at 30 ppm (M2) to an intensity at 10 ppm (M1) of 0.60 or more;  (2) the mole ratio[(a)/(b)] of the aluminum oxy compound (a) to water (b) is 1/3 to 1/0.01;  (3) the molar ratio [(a)/(c)] of the aluminum oxy compound (a) to the compound (c) is 1/3 to 1/0-0.01.		

(summary of claim 30)

Geerts et al.<sup>271</sup> disclose a modified aluminoxane obtained by the reaction of an aluminoxane with an **ene-ol compound** in the presence of a particulate diluent (page 4, lines 6-10). Geerts et al. do not teach or fairly suggest a polymerization catalyst comprising the modified aluminum oxy compound obtained by reacting an aluminum oxy compound with a **specific hydroxy-containing compound and water**.

Kumamoto et al. disclose a modified aluminoxane obtained by the contact of (a) a carrier calcined at 300°C for 5 hours, (b) an organoaluminumoxy compound, and (c) a compound having an electron attractive group and a polar functional group capable of forming a chemical

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bond to the organoaluminum compound, wherein component (c) can be "pentafluorophenol, 2,3,5,6-tetrafluorophenol,....., 4-trifluoromethylphenol" (col. 2, line 13-16; col. 3, lines 52-67; col. 4, lines 1-25; claim 1). Thus, Kumamoto et al. do not teach or fairly suggest a polymerization catalyst comprising the modified aluminum oxy compound obtained by reacting an aluminum oxy compound with **water** in the presence of the specific hydroxy-containing compound. In addition, the Declaration of Masayuki Fujita for the U.S. Application Serial No. 09/661,626 demonstrated that the use of the modified aluminum oxy compound leads to a higher catalyst activity compared with the use of unmodified aluminum oxy compound.

	catalyst system	catalyst activity (g-polymer/mol-Zr-hour)
Experiment 1 (invention)	calcinated silica/methylaluminoxane /pentafluorophenol + <b>water</b> + triisobutylaluminum + dicyclopentadienylzirconium dichloride	$1.11 \times 10^8$
Experiment 2	calcinated silica/methylaluminoxane/pentafluorophenol + triisobutylaluminum + dicyclopentadienylzirconium dichloride	$7.14 \times 10^7$

Marks et al. disclose a modified aluminoxane obtained by the contact of a preformed aluminoxane with an organic compound, wherein the organic compound is phenol (abstract). However, Marks et al. do not teach or fairly suggest a polymerization catalyst comprising the modified aluminum oxy compound obtained by reacting aluminum oxy compound with a **halogenated phenol** and **water**.

Tsutsui et al. disclose an modified organoaluminum oxy compound obtained by the contact of a solution of aluminoxane with an active hydrogen containing compound, wherein the

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active hydrogen containing compound is alcohol (col. 7, lines 26-30; col. 8, lines 36-42).

However, Tsutsui et al. do not teach or fairly suggest a polymerization catalyst comprising the modified aluminum oxy compound obtained by reacting aluminum oxy compound with a **specific hydroxy-containing compound and water**.

In light of the above discussion, it is evident as to why the present claims are patentable over the prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ling-Siu Choi whose telephone number is (703)305-0887.

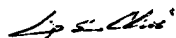
If attempt to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached on (703)308-2450.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the group receptionist whose telephone number is (703)308-2351.



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LING-SUI CHOI  
PRIMARY EXAMINER

February 18, 2005